ABSTRACT INFORMATION FORM
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3-D Motion Camera System for Biometric Measurements

At Lawrence Livermore National Lab, we have developed a so called '3-D Motion Camera System.' The system uses a stereo pair of CCD cameras to synchronously capture snap shots from two slightly different angles. These two images are registered using computer algorithms to generate 3-D shape and depth information of objects in the field of view of both cameras. It produces high resolution 3-D digital surfaces of moving objects at video rate of 30 frames per second. This capability can be applied to face identification for security applications such as access control of secured areas in the military or commercial realm.

Face recognition based on 3-D data can be far more reliable than recognition based on 2-D photos only. Since 3-D systems generate physical dimension of the subject, face recognition based on 3-D data is invariant to perspective (viewing angle) changes and less sensitive to facial expression changes. Dimensional measurements such as the length, width, height of a nose, the distance between eyes, surface normal of the forehead and chin can be extracted from the 3D representation.

Our 3-D motion camera system has several advantages over existing 3-D systems for security applications: (1) the system does not require the subject stay still while taking data; (2) the system does not use laser source, thus eye safe; (3) the system is portable and low-cost. A complete system consists of a PC based host, dual CCD camera and frame grabbing sets, and a strobe light project.

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